FOR USE ONLY BY THE EXAMINER

CLAIMS WITH INTERSTITIAL REFERENCE NUMBERS

FOR DISCUSSION PURPOSES ONLY

CLAIMS

What is claimed is:

1. An apparatus for determining time remaining for fluid flow at a temperature from a fluid outlet **[14]** which receives fluid from a fluid source **[18]**, comprising:

a first temperature sensor **[22]** for sensing fluid temperature at a fluid outlet **[14]**;

a second temperature sensor **[34]** for sensing fluid temperature at a fluid source **[18]**;

a communication link **[29]**; and

a controller **[38]** in communication with said first temperature sensor **[22]** and said second temperature sensor **[34]** via said communication link **[29]**, for comparing sensed fluid temperatures to determine time remaining for fluid flow at a temperature.

2. The apparatus of claim 1 wherein said communication link **[29]** comprises a wireless communication link.

3. The apparatus of claim 2 wherein said wireless communication link **[29]** comprises a radio frequency communication link.

4. The apparatus of claim 1 wherein said communication link **[29]** comprises a hardwire communication link.

5. The apparatus of claim 1 wherein said first temperature sensor **[22]** comprises an integrated circuit temperature sensor **[22]**.

6. The apparatus of claim 1 wherein said first temperature sensor **[22]** comprises a thermocouple.

7. The apparatus of claim 1 wherein said first temperature sensor **[22]** comprises a sensor system comprising **[22]**:

a temperature sensor **[24]**;

a radio frequency transmitter **[28]**;

a power supply **[30]**; and

a housing enclosing said temperature sensor **[24]**, radio frequency transmitter **[28]**, and power supply **[30]** for protection from the environment.

8. The apparatus of claim 7 wherein said sensor system **[22]** further comprises a sleeve **[26]** for placement in line with fluid flow to a fluid outlet.

9. The apparatus of claim 1 wherein said second temperature sensor **[34]** comprises an integrated circuit temperature sensor.

10. The apparatus of claim 1 wherein said second temperature sensor **[34]** comprises a thermocouple.

11. The apparatus of claim 1 wherein said second temperature sensor **[34]** comprises a sensor system comprising:

a temperature sensor **[36]**;

a radio frequency transceiver **[32]**;

a power supply **[40]**; and

a housing enclosing said temperature sensor **[36]**, radio frequency transceiver **[32]**, and power supply **[40]** for protection from the environment.

12. The apparatus of claim 1 further comprising a display device **[42]** for relaying information to a user.

13. The apparatus of claim 12 wherein said display device **[42]** is in communication with said first temperature sensor **[22]** and said controller **[38]**.

14. The apparatus of claim 13 wherein said display device **[42]** comprises:

a display **[44]**;

a radio frequency transceiver **[46]**; and

a power supply **[48]**.

15. The apparatus of claim 12 wherein said display device **[42]** comprises an audio device **[52]**.

16. The apparatus of claim 1 wherein said controller **[38]** comprises a device selected from the group consisting of EEPROMs, microcontrollers, and microprocessors.

17. A method of determining time remaining for fluid flow at a temperature from a fluid outlet **[14]** which receives fluid from a fluid source **[18]**, the method comprising:

providing temperature sensors **[22, 34]** at a fluid outlet **[14]** and fluid source **[18]**;

providing a controller **[38]**;

sensing fluid temperature at the fluid outlet **[14]** and fluid source **[18]**;

communicating sensed fluid temperatures to the controller **[38]**; and

determining time remaining for fluid flow at a temperature from the fluid outlet **[14]** with the controller **[38]** based upon the sensed fluid temperatures.

18. The method of claim 17 wherein the step of communicating sensed fluid temperatures to the controller **[38]** comprises communicating sensed fluid temperatures to the controller **[38]** via a communication link selected from the group consisting of wireless communication links **[29]** and hardwire communication links **[29]**.

19. The method of claim 18 wherein the step of communicating sensed fluid temperatures to the controller **[38]** via a wireless communication link **[29]** comprises:

sensing temperature at the fluid outlet **[14]**;

converting the sensed temperature to a radio frequency signal **[28]**;

transmitting the radio frequency signal **[28]**; and

receiving the transmitted radio frequency signal at a receiver **[32]** in communication with the controller **[38]**.

20. The method of claim 17 further comprising the step of displaying time remaining for fluid flow at a temperature from a fluid outlet **[14]** on a display **[44] [see step 82]**.

21. The method of claim 20 wherein the step of displaying time remaining for fluid flow at a temperature from a fluid outlet **[14]** on a display comprises:

converting time remaining information from the controller **[38]** to a radio frequency signal **[32]**; and

transmitting the time remaining radio frequency signal **[32]** to a receiver **[46]** in communication with a display **[44]**.

22. The method of claim 17 further comprising the step of displaying fluid outlet **[14]** temperature on a display **[44] [see step 70]**.

23. The method of claim 22 wherein the step of displaying fluid outlet **[14]** temperature on a display **[44]** comprises:

converting sensed fluid outlet temperature to a radio frequency signal **[28]**; and

transmitting the fluid outlet temperature signal to a receiver **[46]** in communication with a display **[44]**.

24. The method of claim 17 further comprising the step of audibly indicating **[52]** the time remaining for fluid flow at a temperature from a fluid outlet **[14]**.

25. A method of determining time remaining for fluid flow at a temperature from a fluid outlet **[14]** which receives fluid from a fluid source **[18]**, the method comprising:

sensing fluid temperature at a fluid outlet **[68]**;

sensing fluid temperature at a fluid source **[72]**;

comparing at least two sensed fluid temperatures **[74, 76, 80, Eqns. 1, 2, 3]**; and

determining time remaining for fluid outlet flow at a temperature based upon the comparing step **[80, Eqn. 3]**.

26. The method of claim 25 wherein the step of comparing at least two sensed fluid temperatures comprises subtracting a previously sensed temperature from a later sensed temperature **[74, Eqn. 1]**.

27. The method of claim 25 wherein the step of comparing at least two sensed fluid temperatures comprises determining a rate of temperature change**[Eqn. 2]** from at least two sensed fluid source temperatures.

28. The method of claim 27 wherein the step of determining time remaining **[80, Eqn. 3]** for fluid outlet flow at a temperature comprises:

comparing a sensed fluid outlet temperature to a sensed fluid source temperature **[Eqn. 3 numerator]**; and

determining time remaining for fluid outlet flow at a temperature based upon the comparison between a sensed fluid outlet temperature and sensed fluid source temperature **[Eqn. 3 numerator]** and the rate of temperature change **[Eqn. 2 and Eqn. 3 denominator]**.

29. A method of determining time remaining for fluid flow at a temperature from a fluid outlet which receives fluid from a fluid source, the method comprising:

providing a fluid outlet fluid temperature **[*CT* or *DT*]**;

sensing fluid temperature at a fluid source **[72]**;

comparing at least two fluid temperatures **[74, 76, 80, Eqns. 1, 2, 3, using *CT* or *DT*]**; and

determining time remaining for fluid outlet flow at a temperature based upon the comparing step **[80, Eqn. 3]**.